Nuclear Instruments and Methods in Physics Research B33 (1988) xi–xxi
North-Holland, Amsterdam

CONTENTS

Editorial vii
Committees viii
Conference photograph ix

Section I. Crystal assisted processes and radiation from leptons

Strong field interactions of high energy electrons and photons in Ge crystals
Belkacem, A., G. Bologna, M. Chevallier, N. Cue, M.J. Gaillard, R. Genre, J. Kimball, R. Kirsch, B. Marsh, J.P. Peigneux, J.-C. Poizat, J. Remillieux, D. Sillou, M. Spighel and C.R. Sun . 1

Coherent bremsstrahlung and sidebands for channeled electrons
Andersen, J.U. and E. Lægsgaard 11

Practical applications of coherent transition radiation
Moran, M.J. 18

The quantum recoil effects in radiative losses of superrelativistic electrons in crystals
Kononets, Yu.V. 22

Radiation from axially channeled 1-MeV electrons in germanium
Komaki, K., F. Fujimoto and Y. Kamiya 26

The role of channeling in physical processes accompanying the motion of ~1 GeV electrons through a crystal
Boldyshev, V.F., V.I. Kasilov, G.D. Kovalenko, V.L. Morokhovskij, V.M. Sanin, B.I. Shramenko and N.F. Shul'ga 30

Planar dechanneling
Andersen, J.U., J. Bak and E. Bonderup 34

Channeling radiation from relativistic electrons and positrons in C, Si, Ge: results of a local density calculation
Pathak, A.P. and S. Satpathy 39

Section II. Channeling

Channeling and dechanneling at high energy
Carrigan Jr., R.A. 42

Recent studies on π^+/μ^+ channeling
Fabritius, G., R. Feldmann, G. Flik, T. Gaul, V. Heinemann, D. Herlach, M. Krenke, K. Maier, A. Seeger, W. Staiger and E. Widmann 49

Channeling and chaos
Kimball, J.C., G. Petschel and N. Cue 53

Low energy positron channeling in silicon
Logan, L.R., P.J. Schultz, J.A. Davies and T.E. Jackman 58

Channeling in bent crystals: on the bulk capture process
Mannami, M., K. Kimura, Y. Susuki, Y. Fujii, N. Sakamoto, H. Ogawa, T. Noro, I. Katayama and H. Ikegami 62

The analysis of the rainbow effect in ion channeling by catastrophe theory
Nešković, N. and B. Perović 66

Interaction of a channeled cluster of H_2^{2+} with a $Nb^{15}N_{0.02}$ crystal
Deev, A.S., V.A. Olejnik, P.A. Svetashov, N.A. Skakun, V.E. Storizhko and V.F. Boldyshev 69

0168-583X/87/$03.50 © Elsevier Science Publishers B.V.
(North-Holland Physics Publishing Division)

Diffraction effect of MeV α-particles passing through a thin silicon crystal
Lottner, V., R. Sizmann and F. Fujimoto 73
Resonant excitations of high energy nuclei in aligned crystal targets
Fusina, R. and J.C. Kimball 77
A study of the time delay of excited shape isomers by the blocking technique
Melikov, Yu.V., V.A. Khaimin, S.Yu. Platonov, A.F. Tulinov, O.V. Fotina and O.A. Yuminov . . 81
Analytical description of yields from resonant nuclear reactions induced by channeled particles using a statistical approach
Deev, A.S., V.A. Olejnik, P.A. Svetashov, N.A. Skakun and V.F. Boldyshev 86

Section III. Energy loss and scattering

Dynamic screening: capture and loss processes of protons moving in solids
Echenique, P.M., F. Flores and R.H. Ritchie 91
The structure of small molecules with the Coulomb explosion method
Vager, Z. and E.P. Kanter 98
The influence of a surface barrier in solids on the range distribution of low energy ions
Luo, Z. 102
Charge exchange processes of foil dissociation fragments of fast H_2^+ ions and H_n^+ clusters
Mazuy, B., A. Belkacem, M. Chevallier, M.J. Gaillard, J.-C. Poizat and J. Remillieux 105
Bombarding effects by ionized cluster beams
Yamada, I., H. Usui and T. Takagi 108
The effect of the size of microcrystals on range distributions
Koponen, I. and M. Hautala 112
Comparisons of fast algorithms for calculation of range profiles in layered structures
Webb, R.P. and E. Maydell 117
Range parameters of heavy ions implanted into C films
Grande, P.L., P.F.P. Fichtner, M. Behar and F.C. Zawislak 122
Recent development of the bipartition model of light ion transport: transport of obliquely incident ions
Luo, Z. 125
Energy loss distributions for equivelocity positrons and electrons transmitted through a beryllium foil
Lennard, W.N., P.J. Schultz and G.R. Massoumi 128
Reference stopping cross sections for 30–600 keV protons in silicon
Mertens, P. and P. Bauer 133
Stopping power of slow ions in metals and insulators
Arnau, A., P.M. Echenique and R.H. Ritchie 138
Stopping power of 100–600 keV F^+, Ar^+, As^+, Br^+ and Xe^+ ions in silicon
Tan, C., Y. Xia, H. Yang, X. Sun, J. Liu, Z. Zheng and P. Zhu 142
Free-electron approximation study on slowing down of ions colliding with targets
Kaneko, T. 147
Energy loss and straggling accompanied by charge exchange
Kaneko, T. 151
Stopping powers for MeV tritons in solids
Ogino, K., T. Kiyosawa and T. Kiuchi 155
Magnitude of Z_1^3 correction and the values of the mean excitation potential for 21 metallic elements
Sakamoto, N., N. Shiomi-Tsuda, H. Ogawa and R. Ishiwari 158
Energy loss of ^{4}He ions in H-implanted materials
Yamaguchi, S., K. Takahiro, H. Nakajima, Y. Fujino, S. Sagara, K. Kamada and N. Shiomi-Tsuda 163

Analysis of the angular dependence of proton energy loss in thin films
Balashova, L.L., V.Ya. Chumanov, O.V. Chumanova, G.A. Iferov, A.F. Tulinov, N.M. Kabachnik and V.N. Kondratyev 168

Energy loss of aligned nitrogen molecular ions in an electron gas
Steuer, M.F. and R.H. Ritchie 170

The peculiarities of multiple scattering of fast dinuclear clusters in amorphous matter
Kononets, Yu.V. 174

Vicinage effects in Rutherford backscattering intensities of MeV cluster ions penetrating thin layers of condensed matter
Horino, Y., M. Renda and K. Morita 178

Partial wave expansion of ion–atom elastic scattering at keV energies
Ohya, K. and I. Mori 182

Section IV. Beam–foil and charge exchange

Charge and excitation of swift heavy ions in solids
Betz, H.-D., R. Höppler, R. Schramm and W. Oswald 185

Polarization creation by beam–foil interactions for projectile fragments produced in high-energy heavy-ion collisions and NMR detection of short-lived β-emitting ^{39}Ca
Nojiri, Y., K. Matsuta, T. Minamisono, K. Sugimoto, K. Takeyama, K. Omata, Y. Shida, I. Tanihata, T. Kobayashi, S. Nagamiya, K. Ekuni, S. Shimoura, J.R. Alonso, G.F. Krebs and T.J.M. Symons 193

Electron capture cross sections to hydrogenic states of 1 GeV Ni in solid carbon
Read, P.M., C.J. Sofield, G.D. Alton, P.D. Miller, P.L. Pepmiller, D.C. Gregory and L.B. Bridwell 198

An experimental method for finding the mean equilibrium charge of fast ions in solid media
Zaikov, V.P., E.A. Kralkina, V.S. Nikolaev and E.I. Sirotinin 202

Effect of target density on the equilibrium charge composition of fast He ion beams
Vorobjev, N.F., V.P. Zaikov, E.A. Kralkina and E.I. Sirotinin 207

Effect of target density on the features of charge equilibrium attainment in a beam of fast nitrogen ions
Vorobjev, N.F., V.P. Zaikov, E.A. Kralkina and E.I. Sirotinin 209

Projectile atomic number dependence of equilibrium charge states for 1 and 2 MeV/u ions passing through a carbon foil
Shima, K., E. Nakagawa, T. Kakita, M. Yamanouchi, Y. Awaya, T. Kambara, T. Mizogawa and Y. Kanai 212

Passage of molecular and atomic beams of hydrogen ions through foils
Zaikov, V.P., V.N. Novozhilova, I.S. Dmitriev, Ya.A. Teplova, V.S. Nikolaev and E.I. Sirotinin . 216

Single electron loss cross sections of $^{3}He^{1+}$ ions for solid targets at 52, 62 and 72 MeV
Haruyama, Y., I. Katayama, H. Ogawa, T. Noro, H. Ikegami, F. Fukuzawa, K. Yoshida, A. Aoki and I. Sugai 220

Equilibrium charge fractions of fast He ions in solid gas targets
Fukuzawa, F., Y. Kanamori and Y. Haruyama 224

Charge equilibrium of relativistic uranium ions in matter
Karashima, S., K. Hino and T. Watanabe 227

Correlation between charge states and scattering angles of 150-MeV ^{37}Cl ions exiting from carbon foils
Kitahara, T., H. Yamaguchi, K. Kawatsura, M. Sataka, K. Ozawa, K. Komaki, A. Ootuka and F. Fujimoto 230

Experimental study of level populations in beam–foil excitation
Weng, T.M., Y.M. Zou, F.Q. Lu, H. Ye, C.N. Sun, J.J. Yang, Q.Y. Ge, J.Y. Tang and F.J. Yang 235

Beam–foil experiments of lifetime and spectra of highly ionized aluminum ions
Ando, K., S. Kohmoto, Y. Awaya, H. Kumagai, T. Tonuma and S. Tsurubuchi 239

Nuclear polarization of ^{27}Al produced by multiple tilted foils and detected by Coulomb excitation
Hattori, T., H. Kinoshita, H. Suzuki, S. Kohmoto, M. Ishihara and H. Ohsumi 244
Molecular effects for alignment of excited hydrogen atoms produced by H_i^+ $(i = 1 - 3)$ ions passing through thin carbon foils
Kobayashi, H., N. Oda, F. Nishimura, T. Ichimori and J.S. Park 248
Nuclear polarization of short-lived β emitters ^{8}Li, ^{12}B and ^{27}Si created by the tilted foil technique
Nojiri, Y., K. Takeyama, K. Matsuta and T. Minamisono 252

Section V. Secondary electron and photon emission

Beam–foil convoy electrons
Meckbach, W. and P. Focke 255
An antiproton beam and its interaction with gases and solids
Uggerhøj, E. 265
Emission of X-rays following heavy-ion nuclear reactions
Galster, W., K. Shima, T. Mikumo, T. Aoki, H. Fujiwara, K. Furuno, T. Hosoda, S.C. Jeong, T. Kaneko, T. Komatsubara, Y. Nagashima, M. Ogihara, Y. Tagishi and M. Tomizawa 272
Multiply emitted secondary electrons (MUSE) in ion–solid interactions and a time-of-flight analyzer system
Kuroki, K. and Y. Yamazaki 276
Study of convoy electrons from collisions of hydrogenic projectiles ($Z = 1$ and $Z = 28$) with solids
Kemmler, J., P. Koschar, O. Heil, C. Biedermann, H. Rothard, K. Kroneberger, S. Lencinas, K.O. Groeneveld and I.A. Sellin 281
L-subshell ionization of Ba, La and Ce by proton and ^{4}He ion impact
Vigilante, M., P. Cuzzocrea, N. De Cesare, E. Perillo and G. Spadaccini 286
X-ray emission from inner shell (2p) excited sputtered Al-atoms/ions resulting from Ar^+ and Ne^+ impact on solid Al
Hink, W. and W. May 290
Energy dependence of the Al L_{23} ionization cross section in H^+–Al collisions
Benazeth, C., M. Hou, N. Benazeth and C. Mayoral 295
Decay rates of 2s vacancies for the elements $Z = 37 - 56$
Xu, J.Q. and E. Rosato 297
Polarization of X-ray emission generated by channeled protons
Borisov, A.M., N.G. Goryaga, N.M. Kabachnik, V.N. Kondratyev, V.P. Petukhov, E.A. Romanovsky, E.I. Sirotinin and R. Wedell 301
Molecular effects in KL^n multiple ionization of Al for H^+ and H_2^+ ion impacts
Ootuka, A., K. Kawatsura, K. Komaki, F. Fujimoto, N. Kouchi and H. Shibata 304
Energy spectra of Al-LVV Auger electrons induced by grazing angle incident fast heavy ion impact
Koyama, A., H. Ishikawa and Y. Sasa 308
Auger electron emission upon impact of excited helium atoms: alkali-metal adsorbed Si(111) surfaces
Nishigaki, S., M. Ohara, S. Yokoi and S. Matsuda 311
Angular distribution and linear-polarization of X-rays induced by radiative electron capture process
Hino, K. and T. Watanabe 314
Production and transport of electrons in thin carbon foils
Kemmler, J., S. Lencinas, P. Koschar, O. Heil, H. Rothard, K. Kroneberger, Gy. Szabò and K.O. Groeneveld 317
Double differential electron distributions induced by 170 keV $H^+ \rightarrow He$, $H^0 \rightarrow He$ and H^+–solid-foil interactions
Bernardi, G., S. Suárez, P. Focke and W. Meckbach 321
Double differential spectra of electrons emitted from the forward and backward surface of a carbon foil traversed by a beam of hydrogenic projectiles
Suarez, S., G.C. Bernardi, P. Focke and W. Meckbach 326

Calculated convoy electron distributions due to electron loss collisions inside solid targets
Barrachina, R.O., A.R. Goñi, P. Focke and W. Meckbach 330
Secondary electron emission due to MeV He ions at glancing incidence angles on clean single crystal surfaces
Hasegawa, M., K. Kimura, Y. Fujii, M. Suzuki, Y. Susuki and M. Mannami 334
Depression of yields of low energy secondary electrons induced by impact of heavy ions with high electric charges
Koyama, A., H. Ishikawa, Y. Sasa, O. Benka and M. Uda 338
High charge effects on electron excitations in metal targets for Ar^{12+} impact compared with those for He^{2+} impact
Koyama, A., H. Ishikawa, Y. Sasa, O. Benka and M. Uda 341
Electron and ion emission from solid surfaces bombarded by slow multiply charged ions
Oda, K., A. Ichimiya, Y. Yamada, T. Yasue and S. Ohtani 345
Polarization of Lyman-α radiation after interaction of fast H^+ and D^+ ions with a Ni(111) surface at grazing incidence
Winter, H. and H. Hagedorn 350
Photon emission from resonant coherently excited heavy ions
Fujimoto, F., K. Komaki, A. Ootuka, E. Vilalta, Y. Iwata, Y. Hirao, T. Hasegawa, M. Sekiguchi, A. Mizobuchi, T. Hattori and K. Kimura 354

Section VI. Ion–surface interaction

Specular reflection of fast ions at a single crystal surface
Kimura, K., M. Hasegawa, Y. Fujii, M. Suzuki, Y. Susuki and M. Mannami 358
Charge transfer in low energy atomic and molecular ion–surface scattering
Snowdon, K.J. 365
Adsorbate induced charge-exchange of low-energy He^+ scattered from a TiC(111) surface
Souda, R., T. Aizawa, K. Miura, C. Oshima, S. Otani and Y. Ishizawa 374
Ion–surface interaction to study ion-induced capture and emission of polarized electrons: novel means to investigate surface magnetism
Rau, C. and K. Waters 378
Theory of positron neutralization at solid surfaces
Ishii, A. and S. Shindo 382
Theory of local electronic density dependent neutralization
Ishii, A. 385
Low energy ionization effect of He atoms at surfaces
Muda, Y. and D.M. Newns 388
Calculation of energy and angular distribution of positronium ejected from surfaces
Shindo, S. and A. Ishii 392
Low energy He, Ne and Ar ion scattering from metal surfaces: background and inelastic effects
Bertrand, P., E. Pierson and J.M. Beuken 396
K^+ ion scattering from Ir(110): a study of the pairwise interaction potential
Hetterich, W., H. Derks and W. Heiland 401
Surface channeling of MeV He^+ ions on a SnTe single crystal
Fujii, Y., K. Kimura, M. Hasegawa, M. Suzuki, Y. Susuki and M. Mannami 405
Calculation of the stopping power at the surface of a solid
Kitagawa, M. 409
High resolution measurements of the energy loss of protons scattered by surfaces under well-characterized trajectories
Gotoh, M., N. Matsunami, K. Kitoh, S. Tanaka and Y. Yamamura 415
Measurements of inelastic energy loss in ion–surface-collisions in the incident energy range 200–1500 eV, He^+–Si(111) surface
Shoji, F., Y. Nakayama, K. Oura and T. Hanawa 420

Energy spectrum of He^+ ions scattered from the SnTe(001) surface
Takeuchi, W. and Y. Yamamura 425
Particle reflection and its energy spectrum from solid surfaces with adsorbate atoms
Yamamura, Y. 429
The skipping motion of ions and their energy loss spectrum
Kato, M., T. Iitaka and Y.H. Ohtsuki 432
Sticking of sputtered particles to different surfaces
Emmoth, B. and H. Bergsaker 435
Energy dependent reactions of 3–300 eV C^+, O^+, and CO^+ ions with a Ni(111) surface
Kang, H., S. Kasi and J.W. Rabalais 438
Activated dissociative adsorption of N_2^+ on Ni(100) and Ni(111)
Akazawa, H. and Y. Murata 442
Neutralisation in low energy ion scattering
MacDonald, R.J., D.J. O'Connor, J. Wilson and Y.G. Shen 446
Charge transfer and dissociation in scattering of O_2^+ from Ag(111)
Reijnen, P.H.F., A.W. Kleyn, U. Imke and K.J. Snowdon 451
The charge transfer collision between a low energy ion and a solid surface
Fujima, K., H. Adachi and M. Kimura 455
Negative ionization of atoms and molecules on LaB_6 surface
Imanishi, N. 459
Interatomic and image potentials in low energy ion scattering at metal surfaces
Kato, M., R.S. Williams and M. Aono 462

Section VII. Sputtering and SIMS

Sputtering from atomic-collision cascades
Andersen, H.H. 466
In situ studies of fast atom bombardment and annealing processes by reflection electron microscopy
Ogawa, S., Y. Tanishiro and K. Yagi 474
Preferential sputtering in dilute Cu–Ni alloys
Kamiya, I., T.M. Buck, T. Sakurai and C.H. Patterson 479
Sputtering of metal–impurities deposited on graphite studied by means of combined RBS and AES techniques
Kondoh, K. and K. Morita 482
A FAB-SIMS/SNMS apparatus
Nagai, K. 486
Statistics of sputtering
Eckstein, W. 489
Sputtering by cluster ions
Yamamura, Y. 493
Study of the role of oxygen in atomic excitation processes in sputtering and in secondary electron emission
Veje, E. 497
Clustering effects of sputtered ions from solid surfaces
Wang, G.-H. 502
Measurement of differential sputtering yields by laser fluorescence spectroscopy
Matsuda, Y., K. Yamaguchi, T. Kajiwara, K. Muraoka, M. Akazaki, C. Honda, T. Okada, M. Maeda, Y. Yamamura, E. Kawatoh and J. Fujita 511
Time-of-flight analysis of ionized and neutral species sputtered from nickel targets using multiphoton resonance ionization
Hashimoto, Y., H. Ogoshi and K. Morita 515

Oxygen effects on ion-induced secondary ion and photon emissions from GaAs and Ga surfaces
Inoue, M., Y. Sugiyama, S. Nishigaki and T. Noda 519
Study of oxygen effects in secondary ion energy distributions
Ohwaki, T. and Y. Taga 523
The effect of near-surface structure on sputtering of Cu atoms by Ar ions
Hautala, M. and J. Likonen 526
Calculation of scattering angles in trajectory simulation
Kalsi, R.S. and R.P. Webb 530
Spatial distributions of sputtered particles under ion bombardment of polycrystals
Dodonov, A.I., S.D. Fedorovich, E.A. Krylova, E.S. Mashkova and V.A. Molchanov 534
Ion-induced emission from cobalt single crystal under polymorphic transformation
Abramenko, V.A., A.A. Andreev, V.E. Yurasova and H.A. Motaweh 538
Atomic excitations in sputtering as functions of the projectile energy
Veje, E. 543
Quasi-resonance processes in the emission of excited secondary silicon ions
Abramenko, V.A., D.V. Ledyankin, I.F. Urazgil'din and V.E. Yurasova 547
Sequential SIMS-ISS analysis of oxygen-enhanced secondary ion generation
Kawatoh, E., T. Nagayama, N. Terada, H.J. Kang and R. Shimizu 551
The effect of low glancing angle sputtering on depth resolution in secondary ion mass spectrometry
Maruo, T. and Y. Homma 556
Secondary emission of alkali-metal ions from metal surfaces by low energy ion bombardment
Murakami, J. and I. Kusunoki 560
Ion reflection analysis of the surface topography induced by ion bombardment of a hot metal target
Budzioch, J., M. Soszka and W. Soszka 564
Dynamic observation of cone formation on Cu by ion sputtering
Goto, K. and K. Suzuki 569

Section VIII. Ion beam analysis

Detection of hydrogen adsorbed on tungsten surfaces using the $^{1}H(^{15}N, \alpha\gamma)^{12}C$ reaction
Iwata, Y., F. Fujimoto, E. Vilalta, A. Ootuka, K. Komaki, K. Kobayashi, H. Yamashita and Y. Murata 574
Novel applications of nuclear-reaction analysis to hydrogen-bearing solids
Izsak, K., S. Kalbitzer. M. Weiser and M. Zinke-Allmang 578
Ion resonance and scattering techniques for measuring surface and subsurface topography, and the shape of microscopic objects
Edge, R.D. 582
Surface structure investigations on CdTe crystals by ion beams
Mancini, A.M., A. Quirini, L. Vasanelli, E. Perillo, G. Spadaccini, M. Vigilante and R. Giorgi . . 587
Ion channeling and perturbed angular correlation (PAC) studies of In–As atom pairs in silicon
Swanson, M.L., N.R. Parikh, E.C. Frey and Th. Wichert 591
Lattice location of deuterium in Nb–Mo with ion beams
Naramoto, H., K. Kawatsura, M. Sataka, Y. Sugizaki, Y. Nakai, K. Ozawa, S. Yamaguchi, Y. Fujino and M. Aoki 595
Deuteron channeling for defect analysis of silicon carbide
Nashiyama, I., T. Nishijima, E. Sakuma and S. Yoshida 599
Characterization of the interface of ZnSe–ZnS strained-layer superlattices by MeV transmission electron microscopy and ion-channeling
Kawakami, Y., T. Taguchi, M. Satou and A. Hiraki 603
Dechanneling due to dislocation loops
Gärtner, K. and A. Uguzzoni 607
Structure analysis of Si(100)$2 \times n$ surfaces by ion channeling and blocking spectroscopy
Ichinokawa, T., Y. Yokoyama and K. Fukunaga 611

Compositional analysis of semiconductor heterojunctions: structure of SiC (thin buffer layer)/Si(100) system
Iwami, M., M. Kusaka, M. Hirai, H. Nakamura, T. Koshikawa, K. Shibahara and H. Matsunami 615

Surface analysis by means of high resolution energy loss spectroscopy of 180° elastic scattered protons in the 100 keV regime
Kanasaki, J., N. Matsunami, N. Itoh, T. Oku, K. Kitoh, M. Aoki and K. Matsuda 619

Interface observation using medium energy ion scattering with high energy resolution
Koshikawa, T., R. Kikuchi, K. Takagi, T. Uchiyama, Y. Mihara, Y. Agawa, S. Matsuura, E. Inuzuka and T. Suzuki 623

Cross sections for 170° backscattering of 0.8–2.7 MeV protons from magnesium and sulfur
Rauhala, E. and M. Loumajärvi 628

Quantitative hydrogen analysis by simultaneous detection of $^{1}H(^{19}F, \alpha\gamma)^{16}O$ at 6.46 MeV and ^{19}F-ERDA
Umezawa, K., T. Kuroi, J. Yamane, F. Shoji, K. Oura, T. Hanawa and S. Yano 634

Nuclear reaction analysis and elastic recoil detection analysis of the retention of deuterium and hydrogen implanted into Si and GaAs crystals
Umezawa, K., J. Yamane, T. Kuroi, F. Shoji, K. Oura and T. Hanawa 638

Location of β-emitting ^{12}N in V crystal
Minamisono, T., Y. Nojiri, K. Matsuta, M. Fujinaga and T. Iwayama 641

Stress-induced deuterium redistribution in V, Nb and Ta metals
Koshiishi, M. and S. Yamaguchi 645

Section IX. Ion beam mixing

Microstructure of titanium nitride films produced by the dynamic mixing method
Kiuchi, M., K. Fujii, T. Tanaka, M. Satou and F. Fujimoto 649

Influence of oxygen on the formation of WSi_2 induced by ion beam mixing
Wang, Z.-L. 653

Low energy ion beam mixing of metal–silicon multilayers
King, B.V., S.G. Puranik and R.J. MacDonald 657

Ion beam mixing of Pd/Si bilayers
Lee, R.Y., C.N. Whang, H.K. Kim and R.J. Smith 661

Profile redistribution of implanted Zn impurities in Si due to explosive crystallization from a surface layer
Eryu, O., K. Murakami, K. Takita and K. Masuda 665

Ion bombardment induced mixing of oxygen-exposed solid surfaces during sputtering
Saidoh, M. and R. Yamada 669

Surface treatment and analysis of aluminum alloy at room temperature with titanium-nitride films by dynamic mixing
Sato, T., K. Ohata and M. Fukushima 674

On the formation of BN films by ion beam and vapor deposition
Andoh, Y., K. Ogata and E. Kamijo 678

Ion beam mixing of Al/Mn multilayers
Kido, Y., N. Suzuki and J. Kawamoto 681

Crystallization of carbon films by ion beam assist technology
Ogata, K., Y. Andoh and E. Kamijo 685

Nitrogen ion beam induced recrystallization of AlN_x films
Kobayashi, K., S. Namba, T. Fujihana, Y. Dai and M. Iwaki 689

Section X. Radiation damage

Dynamics and structure of energetic displacement cascades
Averback, R.S., T. Diaz de la Rubia and R. Benedek 693

Formation of defect clusters in nickel and molybdenum by the collisions of heavy-ions with energies of around 100 MeV
Sasaki, S. and A. Iwase 701
Low temperature uranium fission fragment irradiations of α-iron
Dunlop, A., N. Lorenzelli and W. Mansel 706
Deep radiation damage in metals after ion implantation
Friedland, E. and H.W. Alberts 710
Hydrogen-ion-induced detrapping of implanted deuterium in graphite
Scherzer, B.M.U., M. Wielunski, W. Möller, A. Turos and J. Roth 714
Annealing of defects associated with Eu implanted in Si
Bhagawat, A., M.B. Kurup, K.G. Prasad and R.P. Sharma 719
Behaviour of krypton atoms in aluminium
Yagi, E., M. Iwaki, K. Tanaka, I. Hashimoto and H. Yamaguchi 724
Lattice disorder and behavior of implanted atoms in In-implanted TiO_2 (rutile)
Nakamura, S., E. Yagi, T. Osaka and M. Iwaki 729
Retention and release of deuterium implanted into VC_x ($x = 0.44 - 0.95$)
Takahiro, K., H. Nakajima, S. Yamaguchi, Y. Fujino and H. Naramoto 734
Ion-induced release of H and D implanted in Be, C, Si and SiC
Nagata, S., S. Yamaguchi, H. Bergsåker and B. Emmoth 739
Cross sections for atomic displacements in solids by fast positrons
Oen, O.S. 744
Computer simulation of damage depth profiles for 2–7.5 MeV/amu heavy ions incident on pure metals with experimental comparisons
Aruga, T., K. Nakata and S. Takamura 748
Thermally stimulated current from ion implanted Mylar film
Whang, C.N., J.J. Woo, C.C. Lee and R.Y. Lee 752
Applications of the DV-Xα and MS-Xα methods in the study of hardening mechanisms caused by ion implantation into metals
Lin, Y., Z. Liu, Y. Li, W. Wang and J. Li 756
Positron annihilation, X-ray and ESR studies of iron ion implantation crystals of potassium bromide and quartz
Wang, G., H. Sang, G. Pang, L. Chen, L. Dou, D. Shen, M. Teng, S. Li, K. Wang, Y. Wang, J. Liu, T. Jin and S. Hang 760
Re-emission of He from α-SiC irradiated with 200 keV He ions
Nishijima, T. and A. Fukuda 765
Critical helium fluence for hydrogen retention in stainless steel
Ogawa, M., K. Saneyoshi and T. Harada 768
Dynamic disordering process in Si during high dose rate B^+ ion beam implantation
Shukuri, S., M. Tamura and Y. Wada 772
Molecular dynamics simulation of the damage formed in silicon at energies near threshold
Mazzone, A.M. 776
Depth profiling and stoichiometric changes due to high-fluence ion bombardments
Nakagawa, S.T. and Y. Yamamura 780
Model D-band calculation for the threshold energy of defect creation in transition metals
Ono, F. and H. Maeta 784
SiC amorphization as a result of Ga^+ implantation
Tulinov, A.F., N.G. Chechenin, K.K. Bourdelle, V.N. Makarov and A.V. Suvorov 788
Hydrogen release during ERD analysis of hydrogen in amorphous carbon films prepared by rf-sputtering
Fujimoto, F., M. Tanaka, Y. Iwata, A. Ootuka, K. Komaki, M. Haba and K. Kobayashi 792
Defect structure and superconducting transition temperature of ion-irradiated refractory metal carbides and nitrides

Kobayashi, N., H. Tanoue and G. Linker 795
Radiation effects of ion beams on polystyrene resist films
Aoki, Y., N. Kouchi, H. Shibata, S. Tagawa, Y. Tabata and S. Imamura 799
Hydrogen, oxygen and carbon losses during ^{15}N bombardment of PMMA layers
Rudolph, W., D. Grambole, R. Groetzschel, C. Heiser, F. Herrmann, P. Knothe and C. Neelmeijer 803

Section XI. Desorption induced by electronic transition

Electronic and knock-on sputtering of solid rare gases by light keV ions
Schou, J., O. Ellegaard, H. Sørensen and R. Pedrys 808
Mechanisms of atomic processes induced by electronic excitation in solids
Tanimura, K. and N. Itoh 815
Laser-induced desorption from compound semiconductors
Ichige, K., Y. Matsumoto and A. Namiki 820
Collisional and electronic processes under ion, electron and photon bombardment of alkali and alkaline-earth halides
Husinsky, W., P. Wurz, K. Mader, E. Wolfrum, B. Strehl, G. Betz, R.F. Haglund Jr., A.V. Barnes and N.H. Tolk 824
Electronic sputtering of halides by low energy ion and electron bombardment
Poradzisz, A., Z. Postawa, J. Rutkowski and M. Szymoński 830
Nonthermal energy level populations in excited OH electronically desorbed from alkali halide surfaces
Mendenhall, M.H., L. Hudson, D. Russell, J. Tellinghuisen and N. Tolk 834
Initial velocity distributions of secondary ions in electronic sputtering of biomolecules
Widdiyasekera, S., P. Håkansson and B.U.R. Sundqvist 836
Erosion of rare gas solids by electron bombardment
Pedrys, R., D.J. Oostra, A. Haring, A.E. De Vries and J. Schou 840
Channeling study of the orientational dependence of laser-induced damage in GaAs and GaP
Tulinov, A.F., K.K. Bourdelle, N.G. Chechenin, P.K. Kashkarov and A.I. Efimova 844
Desorption induced by ion- and neutral-beam excitation
Albridge, R.G., A.V. Barnes, R.F. Haglund Jr., M.H. Mendenhall, H. Mogul, D.P. Russell, P.M. Savundararaj, N.H. Tolk and P. Wang 848

Section XII. Experimental techniques

Studies of nonnuclear physics at GANIL
Remillieux, J. 851
Coaxial impact-collision ion scattering spectroscopy (CAICISS): a novel method for surface structure analysis
Katayama, M., E. Nomura, N. Kanekama, H. Soejima and M. Aono 857
Microprobe using focused 1.5 MeV helium ion and proton beams
Kinomura, A., M. Takai, K. Inoue, K. Matsunaga, M. Izumi, T. Matsuo, K. Gamo, S. Namba and M. Satou 862
A low-energy fast-atom source
Shimokawa, F. and K. Nagai 867
A TOF-ISS/ERDA apparatus for solid surface analysis
Sumitomo, K., K. Oura, I. Katayama, F. Shoji and T. Hanawa 871

Section XIII. Surface analysis

Structure analysis of crystal surfaces by low energy ion beams
Niehus, H. 876

Structure analysis of crystal surfaces and interfaces with medium-energy ion beams
Frenken, J.W.M. 884
Structure of layered crystals studied by high energy ion beams
Picraux, S.T., L.R. Dawson, J.Y. Tsao, B.L. Doyle and S.R. Lee 891
Surface analysis of crystals by surface channeling
Pfandzelter, R. and M. Schuster 898

Section XIV. Ion beam technology

Recent studies on ion assisted film formation
Weissmantel, C. 905
Radiation effects in (old and new) superconductors
Quéré, Y. 906
Surface and interface analysis by nonresonant multiphoton ionization of sputtered neutrals
Pallix, J.B., K.T. Gillen and C.H. Becker 912
Recent applications of secondary neutral mass spectrometry for quantitative analysis of homogeneous and structured samples
Oechsner, H. 918

Author Index 926